5 What is claimed is:

1. A continuous static polymerisation reactor unit for the production of liquid polymers in a predetermined viscosity range which comprises:

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   a) a reactor comprising an elongate hollow reaction chamber having two ends, one end defining an inlet means adapted for the introduction of a reaction mixture into the reaction chamber, and the other end defining an outlet means;

   b) a supply means in communication with the inlet means for supplying monomers, oligomers, or mixtures thereof to said inlet means; and

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   c) means for introducing at least one viscosity controlling agent into the supply means to form a reaction mixture with the monomers, oligomers or mixtures thereof,

wherein the temperature and flow rate values of the resulting polymer in the elongate hollow reaction chamber are maintained substantially constant; and

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   d) a control means adapted to detect and correct any variation from a predetermined pressure drop value between the inlet means and the outlet means.

2. The reactor unit as recited in claim 1, wherein the reaction mixture is mixed with
25 a preheated pressurised gas at the inlet means.

3. The reactor unit as recited in claim 2, further comprising an inert gas supply to the inlet means, wherein said inert gas supply is adapted to cause the reaction mixture to reach a foam-like consistency.

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4. The reactor unit as recited in claim 1, wherein the means for introducing the at least one viscosity controlling agent into the supply means comprises a pump, adapted to receive and process a signal from the control means, wherein the signal indicates the flow rate of the viscosity controlling agent passing through the pump.

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-23-

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5. The reactor unit as recited in claim 1, wherein the reaction chamber is a hollow cylinder having a diameter of from about 20 to about 250 mm, and a length of from about 250 to about 20,000 mm.

6. The reactor unit as recited in claim 1, wherein the control means is a computer

10 based system, able to monitor pressure drop in the reaction chamber by receiving pressure drop information from a pressure detecting means, and programmed such that said control means (a) translates the received information into a form which allows it to calculate a compensating flow rate of viscosity controlling agent, and (b) transmits a signal detailing the result of the calculation in a form suitable to cause the means for introducing each viscosity controlling agent into a

15 premixer, to initiate the compensating flow rate.

7. The reactor unit as recited in claim 6, wherein the pressure detecting means comprises (a) a manometer which detects a value of the pressure drop between the inlet means and outlet means, and (b) a pressure transmitter adapted to transmit the value to the control

20 means.

8. A process for making liquid polymers within a predetermined viscosity range in a polymerisation reactor, comprising:

a) adding one or more viscosity controlling agents into a stream of monomers, oligomers, or mixtures thereof to form a reaction mixture;

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b) feeding the reaction mixture through an inlet means into a reaction chamber, causing the reaction mixture to polymerise in the reaction chamber and collecting resulting polymer at a polymerisation reactor outlet means, wherein flow rates and temperatures are maintained at

30 substantially constant values, and pressure drop values between the inlet means and the outlet means are monitored by a control means which is adapted to detect and correct variations in said pressure drop from a predetermined value.

-24-

5   9.   The process as recited in claim 8, wherein the polymers are liquid organosiloxane materials made by polymerisation of organosilicon compounds with silicon-bonded -OR radicals, wherein R is a hydrogen atom or an alkyl group having up to 6 carbon atoms, with the proviso that at least one R group per molecule is hydrogen.

10   10.   The process as recited in claim 9, wherein the organosilicon compounds comprise short chain linear polydiorganosiloxane materials having silanol end-groups of the formula

$$HO - \underset{\underset{R''}{|}}{\overset{\overset{R''}{|}}{Si}} - \left[\underset{\underset{R''}{|}}{\overset{\overset{R''}{|}}{OSi}}\right]_n - OH$$

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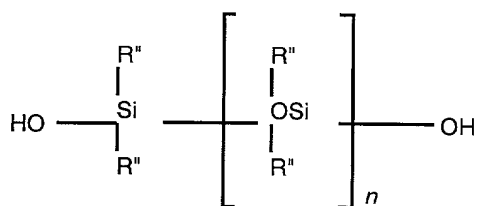
20   wherein n is an integer having a value of no more than 100 and each R" is a silicon-bonded organic substituent.

       11.   The process as recited in claim 10, wherein the viscosity controlling agent is a catalyst or endblocker.

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       12.   The process as recited in claim 11, wherein the catalyst is selected from the group consisting of dodecylbenzene sulphonic acid, n-hexylamine, tetramethylguanidine, carboxylates of rubidium or cesium, hydroxides of magnesium, calcium or strontium and phosphonitrile chloride catalysts of the general formula $[X\,(PX_2=N)\,_sPX_3]^+[MX_{(v-t+1)}R^{III}{}_t]^-$, wherein X is a

30   halogen atom, M is an element having an electronegativity of from 1.0 to 2.0 according to Pauling's scale, R^{III} is an alkyl group having up to 12 carbon atoms, s is from 1 to 6, v is the oxidation state of M, and t is from 0 to v-1.

       13.   The process as recited in claim 11, wherein the end blocker is selected from the

35   group consisting of a triorganoalkoxy silane, a triorganosilanol, a polydiorganosiloxane end-blocked with a triorganosiloxane group at one end and a hydroxyldiorganosiloxane group at the other end, polydiorganosiloxanes having only triorganosiloxane end-groups, and a silazane.

5   14.   The process as recited in claim 13, wherein the reaction is carried out at a temperature of from about 30°C to about 300°C.

           15.   The process as recited in claim 14, wherein the adjustment in the level of viscosity controlling agent added is a function of

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$$OV = \frac{100}{PB}\left[(SP - PV) + \frac{1}{T_I}\int_0^t (SP - PV) * dt - T_D * \frac{dPV}{dt}\right]$$

wherein OV is a percentage of the maximum pump flow rate, PB is a proportional band width, SP is a set point value, PV is a process value and T_D is the differential time.